

## Chapter II

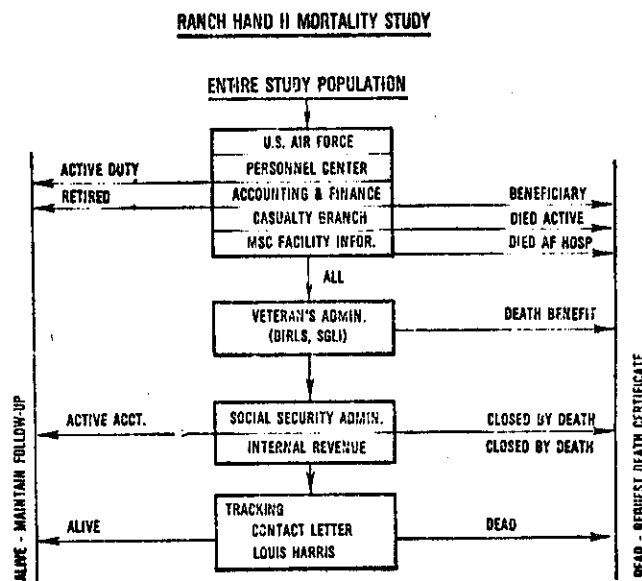
### THE MORTALITY DETERMINATION PROCESS

#### 1. Introduction

The mortality status of the Ranch Hand group and their mortality comparisons are, and will continue to be, ascertained using four major data sources: USAF, Veterans Administration (VA), other Governmental and morbidity population tracking. The mortality determination process using these data sources is presented in Figure 1.

Figure 1.

#### RANCH HAND II MORTALITY DETERMINATION ALGORITHM



The entire study population was matched or checked against the first three sections of this algorithm while only the morbidity population was contacted and tracked. A description of the data sources within the algorithm follows.

#### 2. United States Air Force Data Sources

The USAF data sources include the USAF Military Personnel Center (MPC) records, the USAF Accounting and Finance Center records, and the USAF Medical

Service Center Facility Use Data. The USAF MPC records include the individual's military personnel record and the data accumulated by the Casualty Branch of the MPC. Individual military personnel records are created at the time of induction into the USAF, and reflect a chronological history of the individual's military career. Epidemiologically, these records are an invaluable data source as they can be used for the development of occupational histories, identification of race, sex, and date of birth as well as for location of personnel, and for determining vital status. Hard copy records of these data are maintained at the individual's base of assignment while on active duty; a computer copy of these records is maintained at the USAF military personnel center, Randolph AFB, Texas. Following retirement and/or separation from the USAF, these records are forwarded to the National Personnel Records Center (NPRC), St Louis, Missouri, the record repository for all military personnel records. They are indexed by Social Security Account Number or Air Force Serial Number at the NPRC. If an individual should die while on active duty, after retirement, or within 120 days of separation from active duty, it is the responsibility of the Casualty Branch of the USAF Military Personnel Center to update the hard copy military personnel record and the MPC computer data base and to inform the USAF Accounting and Finance Center of this fact. At the same time, USAF MPC personnel initiate a copy of the USAF Form 1312, Report of Retired Casualty, or Department of Defense DD Form 1300, Report of Casualty. The selection of the appropriate form is based on the current status of the individual concerned. The DD Form 1300 also clarifies an individual's casualty status which can be either battle or nonbattle. Copies of the appropriate death form are sent to appropriate agencies while the original is placed in the individual's military personnel record.

Since the initial review of military personnel records, a system has been established with the Casualty Branch of the Military Personnel Center wherein all active duty and retired death forms are forwarded monthly to the Occupational Epidemiology Section of the USAF School of Aerospace Medicine Epidemiology Division. In this way, the mortality status of all active duty and retired study subjects is systematically determined on a continuing basis.

The USAF Accounting and Finance Center data base was used as a resource to update individual Air Force serial numbers to Social Security numbers. The Social Security number is required for all other aspects of the mortality algorithm.

The Air Force Medical Service Center (AFMSC) Facility Use Data is a computer data base containing information regarding all active duty and retired deaths that occur in Department of Defense (DOD) Medical Facilities. This data base identified no additional deaths in the mortality population, but did verify the deaths known to have occurred in DOD hospitals.

In addition to the USAF data bases, the Ranch Hand Association, a reunion association of approximately 850 Ranch Handers, has contributed to the success of this study. This group has assisted the Principal Investigators in the ascertainment of the exposed population, and in the determination of the current location and the mortality status of the group. The association contacts all of its members yearly through newsletters and provides updated information to the Air Force investigators.

### 3. Veterans Administration Death Beneficiary Identification and Record Location Subsystem

The Beneficiary Identification and Record Locator Subsystem (BIRLS) is a Veterans Administration data base generated by the Veterans Administration for determination of funeral allowance. If the family of the deceased informs the funeral director that the deceased served in the US military, the funeral director submits the required data to the Veterans Administration. In January 1981, August 1982, and January 1983, the BIRLS data base was searched for Ranch Hand and comparison deaths. In addition to these searches, the Department for Veterans Benefits, Veterans Administration, coordinated the gathering of death certificates from VA regional offices.

### 4. Other Governmental Data Sources

#### A. Internal Revenue Service

Public Law 96-126, Section 502, 28 November 1979, authorized the use of Internal Revenue Service (IRS) addresses for individuals who had been exposed to occupational hazards in order to determine the status of their health. The National Institute for Occupational Safety and Health (NIOSH) coordinated the USAF requests for these IRS addresses. This system is based on the address shown on individual tax returns and is corrected once a year. The addresses are verified by NIOSH through use of a post card mailed to the post office responsible for the individual's mail delivery. NIOSH assumes that the individual is alive if he files a tax return and if the verification scheme confirms his address for mail delivery. The IRS assumes an individual is dead if the individual is so reported on a joint tax return. The IRS data base search provides an incomplete mortality determination, however, since absence of an individual tax return does not necessarily imply death of that individual.

#### B. Social Security Administration

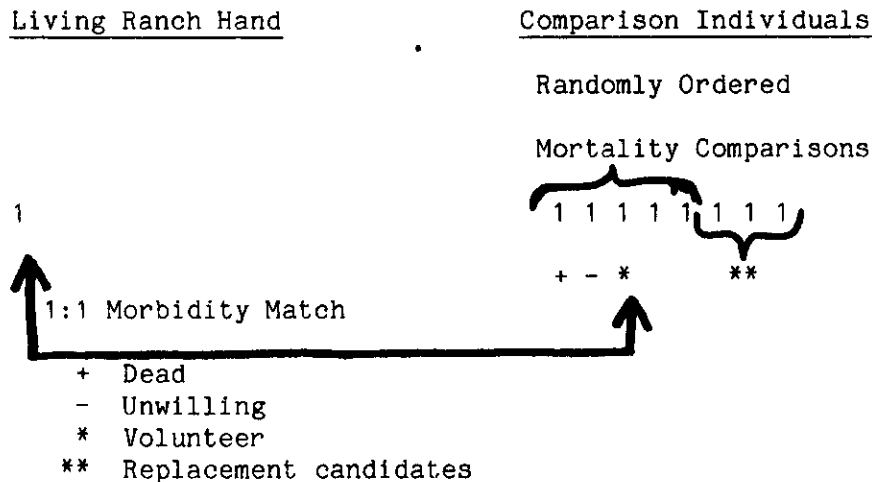
The Social Security Administration (SSA) is a source of mortality information based on data maintained by the Office of Renumeration and Earnings. The basis for this data is employer-reported earnings. The SSA assumes that an individual is living if there is no indication of death on the individuals record and earnings are recorded for the last calendar year or retirement, disability, black lung or supplemental security income payments are being made. The SSA did inform us that they do not conduct an exhaustive search, and all deaths are not necessarily reported to SSA. Therefore, this mortality information may not be complete.

### 5. Morbidity Population Tracking

Individual tracking techniques apply only to the morbidity population, defined as those selected and compliant to questionnaire. The morbidity population for this effort is defined as all Ranch Handers and their morbidity comparisons. The morbidity comparisons are, in general, also mortality comparisons. The selection procedure for the morbidity study is presented in Figure 2.

Figure 2.

SELECTION PROCEDURE FOR THE QUESTIONNAIRE,  
PHYSICAL EXAMINATION, AND FOLLOW-UP STUDY



In this figure, the first randomly ordered comparison was found to be dead. The second was contacted but was unwilling to participate and the third volunteered to participate in the questionnaire component of the morbidity effort. This contacting process for the morbidity effort was the final step in the baseline mortality determination. The original contact was made by certified mail. Each Ranch Hand and a random living comparison were sent an introductory letter and fact sheet signed by the USAF Surgeon General. A Louis Harris and Associates (LHA) interviewer then accomplished an in-home interview.

LHA identified two Ranch Handers and nine comparisons who could not be located. All eleven unlocatable subjects were assumed living and remain included in the mortality study.

#### 6. Receipt and Coding of Death Certificates

Death certificates were ordered from the vital statistics department of the appropriate state, trust territory, or foreign country. Death certificates or their equivalent were obtained on all appropriate subjects.

All death certificates were coded by two individuals, trained by the National Center for Health Statistics (NCHS) in underlying and multiple cause of death coding procedures, using the International Classification of Diseases, Ninth Edition (1977) coding system. Classification of the underlying cause of death was in accordance with NCHS decision tables. Each coder independently classified the underlying and multiple causes of death and gave the coding worksheet, with each corresponding death certificate, to the coding supervisor, a trained nosologist, for reconciliation. Following reconciliation, one of the coders placed the death code information, by computer terminal, in the death certificate mortality file via a blind verification program designed to mimic the NCHS underlying multiple cause of death coding sheet. At the

conclusion of this initial input of the death codes, a copy of the death certificate was forwarded to NCHS for further validation. The NCHS returned coded death certificates, which were then compared with the Air Force classification. Discordances were resolved in cooperation with NCHS and entered into the data base.

## 7. Results

Chapter II has reviewed the comprehensive, cohesive, sequential ascertainment process of death in the study populations. This process has resulted in the identification of 50 dead Ranch Hand subjects and 250 dead comparison subjects. Although it is understood that early differential ascertainment occurred in the Ranch Hand members (because of detailed knowledge of the study group), it is judged that the overall comprehensive ascertainment process is currently balanced with respect to the two groups.

Table 3 and Appendix IV contain summary counts by age, job, and race category for all Ranch Handers and their mortality comparisons; these counts reflect mortality as of 31 December 1982, as known on 27 April 1983. In the stratified analyses, the term "at risk" is defined as simply the number of subjects within a specific stratum, and in life table analyses, as the number of subjects entering a specific age bracket. The term "rate" is the proportion of those individuals "at risk" who are dead.

Table 3

### OCCUPATIONAL AND RACE SPECIFIC MORTALITY

Race	Occupation	Ranch Hand			Comparisons		
		At Risk	Dead	Rate	At Risk	Dead	Rate
Non-Black	Officer-pilot	349	12	.034	1740	72	.041
	Officer-navigator	80	2	.025	390	13	.033
	Officer-other	25	1	.040	123	3	.024
	Enlisted-flt eng	189	6	.032	935	46	.049
	Enlisted-other	528	25	.047	2628	97	.037
Black	Officer-pilot	6	0	.000	13	0	.000
	Officer-navigator	2	0	.000	10	0	.000
	Officer-other	1	0	.000	2	0	.000
	Enlisted-flt eng	15	2	.133	75	9	.120
	Enlisted-other	52	2	.038	255	10	.039
TOTAL		1247	50	.040	6171	250	.041